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(2)

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July 19, 2001

Assistant Commissioner for Patents  
Washington, DC 20231

SUBJECT:      Applicant:      R.E. Creek  
                    Serial No:      09/879,594  
                    Filed:          June 12, 2001  
                    For:            AN ASPHERIC SCREEN FOR  
                                    VISUAL DISPLAY APPARATUS  
                    Docket No:      GJ-222J

Dear Sir:

Enclosed is a certified copy of United Kingdom Patent Application No. 0014672.0 filed on June 15, 2000, which is the priority document for the subject application.

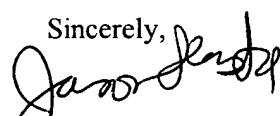
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If any payment during prosecution is found to be incorrect, please charge any deficiency or credit any overpayment to my Deposit Account No. 09-0002. A copy of this letter is enclosed for use by the Finance Branch in the event that it is necessary to make any charge or credit to my deposit account.

In addition, pursuant to Rule 1.136(a)(3), the Office is hereby authorized to treat any future reply requiring an extension of time as incorporating a request therefor. Also, any request or Petition for an Extension of Time notwithstanding an inadvertent reference in the Petition to a shorter period of time is to be treated as requesting the appropriate length of time.

Kindly acknowledge receipt of the foregoing by returning the enclosed self-addressed postcard.

Sincerely,



Jason D. Shanske  
Reg. No. 43,915

JDS:dg  
Enclosure

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INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

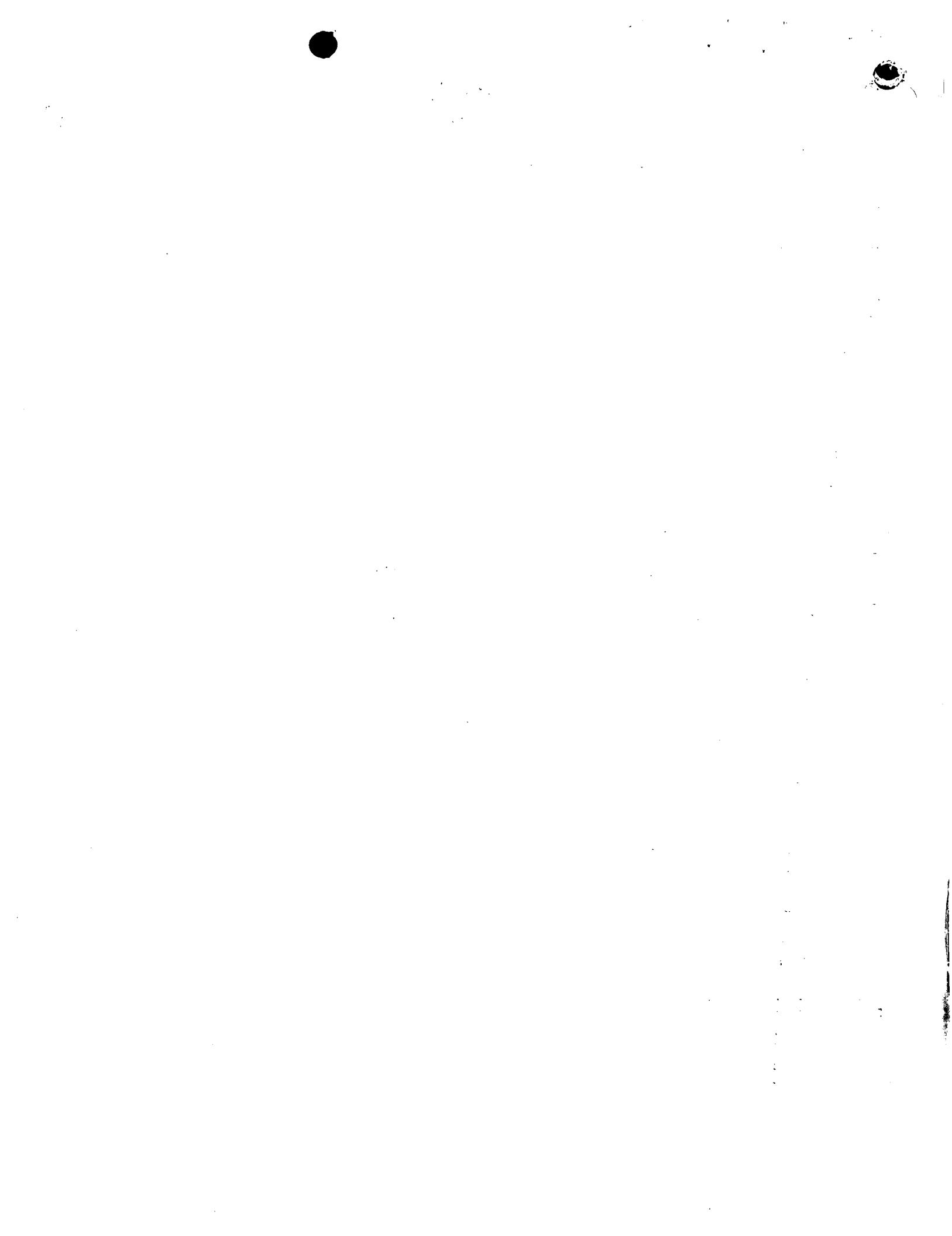
In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Dated 12<sup>th</sup> June 2001



5 JUN 2000

LONDON

The Patent Office

16 JUN 2000 E54 17-4 001821

P01/7700 0 0016572.0

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P01/7700 0 0016572.0

**Request for grant of a patent***(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)***1. Your reference**

Jg = 2613

**2. Patent application number***(The Patent Office will fill in this part)***0014672.0****3. Full name, address and postcode of the or of each applicant (underline all surnames)****SEOS DISPLAYS LIMITED,  
EDWARD WAY,  
BURGESS HILL,  
WEST SUSSEX, RH15 9UE  
UNITED KINGDOM.****Patents ADP number (if you know it)****If the applicant is a corporate body, give the country/state of its incorporation****UNITED KINGDOM****4. Title of the invention****IMPROVED VISUAL DISPLAY APPARATUS****5. Name of your agent (if you have one)****GRAHAM JONES & COMPANY  
77 BEACONSFIELD ROAD,  
BLACKHEATH,  
LONDON SE8 7LG****"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)****YMAJHON & CO MAIL****PE043 3285 060****SE0101110000  
YMAJHON & CO MAIL  
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YMAJHON & CO MAIL****Patents ADP number (if you know it)****2097001****6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number****Country Priority application number Date of filing  
(if you know it) (day / month / year)****7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application****Number of earlier application****Date of filing  
(day / month / year)****8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:****a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an****applicant, or****c) any named applicant is a corporate body.****See note (d)****YES**

9. Enter the number of sheets for any of the following items you are filing with this form.  
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Continuation sheets of this form

Description 2

Claim(s)

Abstract

Drawing(s) 2

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

2

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents  
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

GRAHAM JONES &amp; COMPANY

Date

15/6/00

12. Name and daytime telephone number of person to contact in the United Kingdom

GRAHAM H. JONES  
EUROPEAN PATENT ATTORNEY  
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020 8858 4039

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## Statement of inventorship and of right to grant of a patent

The Patent Office  
Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference

Jg-2613

2. Patent application number  
(if you know it)

0014672.0

15 JUN 2000

3. Full name of the or of each applicant

SEOS DISPLAYS, LIMITED

4. Title of the invention

IMPROVED VISUAL DISPLAY APPARATUS

5. State how the applicant(s) derived the right  
from the inventor(s) to be granted a patentBY VIRTUE OF AGREEMENT AND  
CONDITIONS OF EMPLOYMENT6. How many, if any, additional Patents Forms  
7/77 are attached to this form?

(see note (c))

7. I/We believe that the person(s) named over the page (and on  
any extra copies of this form) is/are the inventor(s) of the invention  
which the above patent application relates to.

Signature

GRAHAM H. JONES  
GRAHAM JONES & COMPANY

Date

15/6/00

8. Name and daytime telephone number of  
person to contact in the United KingdomGRAHAM H. JONES  
EUROPEAN PATENT ATTORNEY  
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Journal of Health Politics

Enter the full names, addresses and postcodes of the inventors in the boxes and underline the surnames

Roy EDWARD CREEK

37 WEST POINT,

NEWICK

EAST SUSSEX, BN8 4NU,  
UNITED KINGDOM.

Patents ADP number (if you know it):

6443708001

Patents ADP number (if you know it):

## VIDEADOS A ALVARO RODRIGUEZ

23 JUL 1959  
MURKIN, J. M.  
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It should be noted that the *in vitro* assay of the *in vivo* testis is not a quantitative assay, and the results of the *in vitro* assay are not necessarily proportional to the *in vivo* testis. The *in vitro* assay is a qualitative assay, and the results of the *in vitro* assay are not necessarily proportional to the *in vivo* testis.

### Reminder

## Have you signed the form?

Patents ADP number (if you know it):

## Improved Visual Display Apparatus

This invention relates to visual display systems and in particular to visual display systems for simulations used for training, research, leisure or entertainment.

It is well known to use large collimated displays in such simulators. It is well known that such displays may conveniently be formed from a large tilted, concave mirror wrapped around the simulator cockpit, which collimates an image projected onto a large screen wrapped around the upper part of the cockpit above the windows. The screen may be front-projected or back-projected.

For convenience and economy, the collimated image provided by the display should be visible from the full cockpit volume. In particular, an image of good quality and correct perspective should be visible to both pilots in a wide-bodied aircraft simulator.

To enhance the realism of such simulators, the field of view of the display should be as large as possible. Horizontal fields of view of  $180^\circ$  to  $225^\circ$  are common. Vertical field of view of  $40^\circ$  is most common, with  $45^\circ$ ,  $50^\circ$ ,  $55^\circ$  and  $60^\circ$  also in use. It is known that for typical wide-bodied cockpits,  $40^\circ$  vertical field of view may be satisfactorily achieved with a spherical mirror of about 3m radius and a spherical screen. A vertical field of view of  $50^\circ$  may be achieved with the same radius mirror, but the screen must become aspheric. For  $60^\circ$  vertical field, not only must the screen become aspheric, but also the mirror radius must increase to about 3.3m. Symmetry considerations arising from the large horizontal field of view and issues of manufacturing complexity mean that both mirror and screen are surfaces of revolution about a vertical axis (not necessarily a common axis). A typical aspheric screen shape would be a torus.

It will be appreciated that as the display system becomes larger, it becomes more costly to manufacture and its greater mass imposes an increasing load on the simulator. Also, since such simulators are usually mounted on some kind of motion system, the motion envelope expands, requiring a larger, more expensive building to house the simulator. It will also be appreciated that the large collimating mirror should be as lightweight as possible and preferably in one piece (so as not to introduce gaps in the field of view). It is well known to form this mirror from a stretched, aluminised plastic sheet. Sheet of adequate quality is only available up to a certain width, which also limits the size of the system.

A  $60^\circ$  vertical field of view is found to be particularly useful for helicopter simulators, where it is typically disposed  $20^\circ$  up and  $40^\circ$  down. It is found that such a display system can be realised within the constraints mentioned above. Such a large vertical field of view would be useful in other applications, perhaps disposed equally about the horizon, or with an upward bias. A  $35^\circ$  up,  $25^\circ$  down disposition would be of great interest for in-flight refuelling simulation. However, it is found that a collimated image of adequate quality cannot be obtained within the constraints mentioned above for such a field of view disposition.

It is the aim of this invention to provide a larger vertical field of view with no downward bias without substantial increase in the size or complexity of the collimated display system.

Accordingly, the present invention provides a means to make an aspheric screen that is not a surface of revolution about an axis. Conceptually, the screen begins as a surface of revolution, which is split along its median section, the two parts separated and a short cylindrical centre



section inserted. The width of the cylindrical section is a further design parameter that can be used to achieve a more advantageous trade-off between field of view and image quality.

An embodiment of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

**Figure 1** shows a circular horizontal section through a known screen shape.

**Figure 2** shows the screen of Figure 1 conceptually split and separated.

**Figure 3** shows the screen of this invention with the central cylindrical section inserted (still in horizontal section).

It will be appreciated that known screen shapes formed as surfaces of revolution will be circular in this cross-section, and that the central cylindrical segment of this invention will appear as a straight line in this view.



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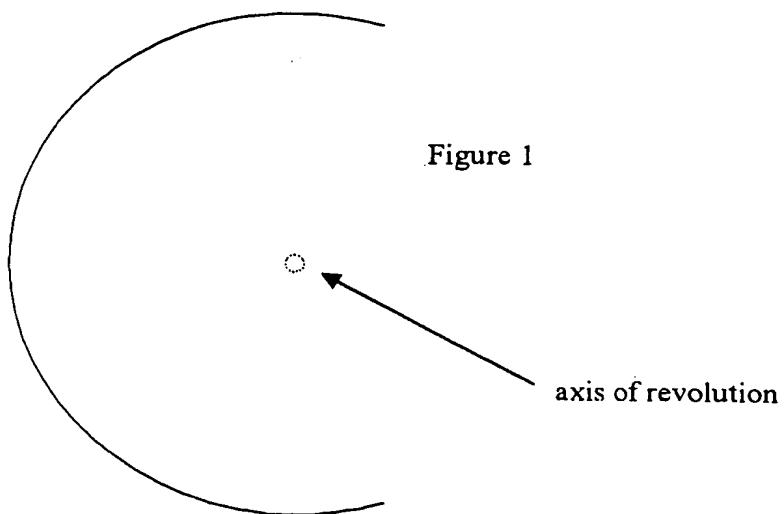


Figure 1



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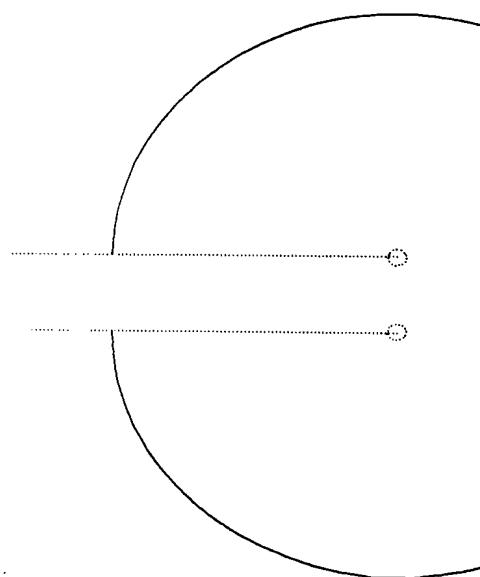


Figure 2

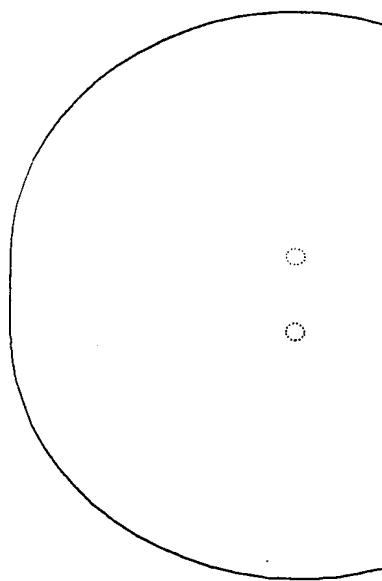


Figure 3

